[0061] **CLAIMS**

We claim:

1. A method of forming a silicon oxide layer having a thickness ranging from about 3 μm to about 200 μm in a silicon containing structure, said method comprising:

a) etching a plurality of trenches having a nominal trench opening width, a nominal trench opening height and separated by trench walls of nominal wall thickness within said silicon structure; and

b) thermally oxidizing said silicon structure.

2. The method according to Claim 1, wherein said nominal thickness of said trench wall is consumed during said thermal oxidation to provide silicon oxide.

3. The method according to Claim 2, wherein said nominal trench opening width is about 2 times said nominal wall thickness.

4. The method according to Claim 2, wherein said nominal wall thickness is less than 4 μm.

5. The method according to Claim 1, wherein said trench openings are formed by plasma etching.

6. The method according to Claim 5, wherein said plasma etching is reactive ion etching.

7. The method according to Claim 6, wherein said reactive ion etching is anisotropic etching of using a fluorine-containing etchant component.

8. The method according to Claim 6, wherein an aspect ratio of said nominal trench opening height to said trench opening width ranges from about 1 to about 50.

9. The method according to Claim 8, wherein said aspect ratio is less than about 50 : 1.

10. The method according to Claim 1, wherein said method includes an additional step:

c) selectively removing silicon oxide from at least one exterior surface of said silicon containing structure.

11. The method according to Claim 7, wherein said etching produces a trench having essentially vertical sidewalls.

12. A method of forming an electrically isolating region in a silicon containing structure comprising:

etching a plurality of openings, each opening separated by a nominal distance in said silicon-containing structure; and

oxidizing said silicon structure.

13. The method according to Claim 12, wherein said opening extends only partly through a silicon-containing layer in said silicon-containing structure or extends only partly though said silicon-containing structure.

14. The method according to Claim 12, wherein said opening extends completely though a silicon-containing layer in said silicon-containing structure or extends completely through said silicon-containing structure.

15. The method according to Claim 14, wherein a portion of said silicon-containing layer or said silicon-containing structure is connected to another portion of said silicon-containing layer or silicon containing structure respectively, by at least one silicon bridge.

16. A method of forming a shaped electrically isolated region in a silicon structure comprising:

etching at least one first opening a nominal distance into a first side of said silicon structure;

etching at least one second opening a nominal distance into a second side of said silicon structure; and

oxidizing said silicon structure.

17. The method according to Claim 16, wherein said first side of said silicon structure is directly opposite to said second side of said silicon structure, and wherein unetched silicon forms a silicon bridge between said first opening and said second

opening.

18. The method according to Claim 17, wherein said silicon bridge between said first opening and said second opening is about 4μm or less in thickness.

19. The method according to Claim 16, wherein silicon oxide formed on at least one exterior surface is selectively removed by plasma etching.

20. The method according to Claim 16, wherein silicon oxide formed on at least one exterior surface is selectively removed by lapping or polishing.

21. A method of forming an isolating interconnect through-opening within a multi-layered silicon structure comprising:

a) etching at least one through-opening through a plurality of individual silicon structure layers at a particular location on each silicon structure layer;

b) oxidizing said silicon structure, creating at least one oxidized region at each through-opening;

c) selectively removing silicon oxide from an exterior surface of each silicon structure layer which is to be bonded to another silicon structure or silicon structure layer; and

d) bonding a plurality of silicon structures to provide at least one continuous oxidized region through said bonded silicon structure.

22. The method according to Claim 21, wherein said bonding is fusion bonding.

23. The method according to Claim 21, wherein said bonding is via eutectic processing.

24. The method according to Claims 21, wherein said multi-layered silicon structure includes stress release elements.

25. The method according to Claim 21, including an additional step e) in which oxidized silicon is removed from exterior surfaces of said multi-layered silicon structure subsequent to said bonding.

26. The method according to Claim 21, wherein subsequent to said bonding, an additional step f) is carried out in which a through-opening is created through at least one continuous oxidized region which extends through said multilayered silicon structure.

27. The method according to Claim 26, wherein a conductive material is applied over or passed through said through-opening.

28. The method according to Claim 27, wherein said through-opening is coated with a conductor.

29. A method of creating isolation regions in a silicon structure comprising:

etching a plurality of openings through said silicon structure, creating a shaped portion separated by spokes between said plurality of openings; and

oxidizing said silicon structure, wherein said spokes are converted to silicon

oxide which at least partially fills said etched openings.

30. The method according to Claim 29, wherein said openings are completely filled with silicon oxide.

31. The method according to Claim 30, wherein said spokes exhibit a thickness of about 4 μm or less.

32. The method according to Claim 29, wherein silicon oxide is removed from at least one exterior surface of said silicon structure.